These 5 Books of an Outline to a Course of Lectures on Surgical and Relative Anatomy, were written in the Evenings and Nights of the Summer of 1852 at Bloomington.

The important parts omitted, such as Hernia, the Pericardium &c are contained in my former Books on Anatomical Surgery.

This Synopsis I found valuable in the Lectures which I delivered in the Session of 1852-53. immediately following my return to the University in March of 1852.

J. Mott.

Introductory Lecture
to
a Course of Lectures on Surgical Anatomy
and the
Operations of Surgery.

It is expected in an Introductory Discourse that we should look back to the origin of the Science we are to teach.

To carry our enquiries back into time and note the great epochs, but also mark its progress and effects upon the formation of sound Operative Surgery.

The cultivation of the Anatomy of Relation will continue in all coming time to place the Science of Surgery of pure Classic Surgery upon the most elevated pinnacle of the Healing art.

It is its true and legitimate Landmark – the true Polar Star of the Operator.

Maps and Charts will do, but the true

was made to Surgical practice. Since which it has spread its happy influence over the whole Surgical world.

Soon, very soon the wave of improvement reached our ocean shores, brought by the few American Pupils who then visited Europe.

About one hundred and two years ago, (1750), the first Dissection and Injection of the Body of a Criminal was made by Drs. Bard and Middleton in Kings College, now Columbia, in this City, for the benefit of Students.

It is not from arrogance but a feeling of gratification, that I can state, that forty two years ago, I publickly announced a Course of Lectures on Surgical Anatomy in Columbia College in this City. They were the first I well know that were given in this country.

It was considered as an absurdity, and spoken of in derision, that Surgery could be so associated with Anatomy as to justify the title of Surgical Anatomy.

There is no necessity said an eminent Professor of Anatomy of learning any thing more than what Description Anatomy will teach.

and unassuming manner is sometimes modest - the dead body -

The first impulse to this beautiful and enduring Pillar in the Temple of Surgery was given by that Master spirit in Operative and Pathological Surgery - Sir Astley Cooper -

His admirable and Elaborate Dissections of the Relative Anatomy of Inguinal and Femoral Hernia, prepared the way, and fully settled the knowledge of the Relative structures, and the safety of the steps of Surgical Operations for its relief, upon the sound and exact principles of a true Science -

Relation The association of the Anatomy of structures with Operations and Diseases was ever to him -

It truly forms one of the noblest Epochs in our Science -

To confirm this assertion, we will give some illustrations and proofs, from the Writers and Surgeons who immediately preceded his time -

Description of what their knowledge was -

I bore it as became my age, with commendable composure, confident that time would bring about all that was right, determined to wait my time.

This fortunately soon arrived, and it was indeed a great triumph for me.

A case of Traumatic Neuralgia was sent to me from the country in the bottom of the foot of a Young Lady, from a punctured wound.

It was of nearly two years standing, and she was from the violence of pains in the bottom of the foot together with violent spasms in the calf of the leg, totally unable to use it.

The bottom of the foot had been cut and scarified in various directions, & as narcotics had destroyed extensively the surrounding parts, but all to no purpose, as the disease still existed.

Narcotics and Tonics had all been tried in vain.

I proposed to her to cut out an inch or more of the Posterior Tibial Nerve, to which she readily consented. I now asked myself the ques-

Compare the knowledge of Pott, for example with the magnificent illustrations of Astley Cooper.

He stamps with simplicity and beauty the truths, the justness of his world wide fame and lasting reputation.

These truths and bland marks in Operative Surgery soon spread over Great Britain - from London to Edinburgh - to Dublin to Continental Europe.

By his attention and endearing Principle, the wave of improvement soon reached our happy shores - and we hope to believe its is rapidly extending its blessed influence into the far distant West.

Onward - Westward is the word - not the cry of Conquest & blood-shed, but the soft and persuasive voice of Peace and Science.

Our mission is then onward, verifying the Prophetic lines of Bishop Berkeley -

"Westward the star of Empire takes its way".

How delightfully it is for me to retrospect upon the Close of this important application of Anatomy to Surgery, and that I lived and learned to that that great focus of Know-

=tion as to its relation to the Internal Malleolus and the Tendo Achillis, and the Posterior Tibial Artery. This I could not answer, never having studied its Relations with a view to an Operation upon it.

The Surgical Anatomy of this Nerve, I soon informed myself of by an appeal to the dead body as has always been my practice in all Operations, when not thoroughly informed.

Wishing to have the Operation sanctioned by the best authority I requested that my old friend & Colleague Dr Pott might be called in to Consult upon the Case. I now proposed that the Operation should be performed, in which he fully concurred.

I now asked him how this Nerve lies Relatively to such and such parts, to which he answered that he knew it run behind the Internal Malleolus, and that was what Special Anatomy taught.

I now told him that it run nearer the Tendo Achillis than the Malleolus, that it was between the Artery and the Tendo Achillis, and that

knowledge, the Borough School of St Thomas and Guy's Hospital in London - where the Master (Blair Bell) and the Pupil (Sir Astley Cooper) shone so conspicuously brilliant -

The first impulse to this beautiful Science was given here, by that Master spirit in Operative and Pathological Surgery - Astley Cooper -

Hence you cannot be surprised that in looking back into time, it affords me unspeakable delight to know that it was there a Pupil at that School, and there learnt my first lesson - and made my first dissection of these important parts -

His admirable and splendid Dissections of the Relations Anatomy of Inguinal & Femoral Hernia, prepared the way, and fully established the true knowledge of the Surgical Anatomy of this important subject - He settled upon the principles of an exact Science the steps to be pursued in the several Hernia which occur at the Groin -

The association of the Anatomy of Relations with Surgical Operations the world owes to him - And it forms in the Diadem that will

this was what was called Relative or Surgical Anatomy — and that it was a Science by itself and could never be learnt in any other way than by studying it as a distinct branch of knowledge —

I performed the Operation, took out about an inch of the nerve to cure my Patient.

"Les faits sont les meilleurs raisonnements, says the celebrated Montesquieu, "car un fait est le raisonnement, plus la preuve".

forever encircle his brow, the purest gems.

What was the knowledge of this subject possessed before his time.

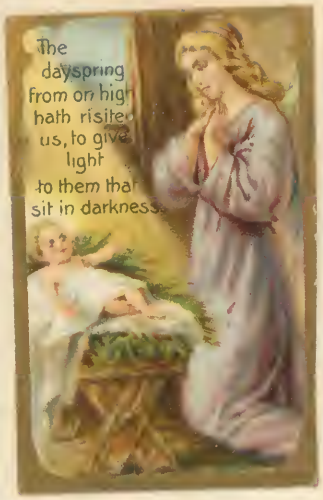
Give some explanation of it.

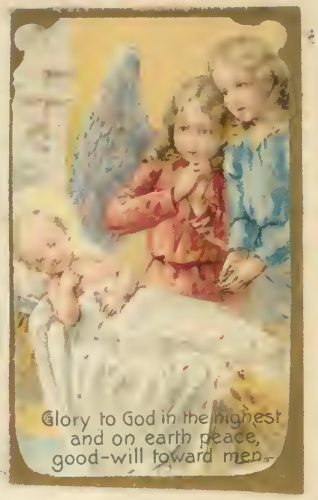
Not half a century has yet rolled away since the first waves of surgical impulses were seen in London, and wave has followed wave, until the whole surgical world feels its mighty and healing influences.

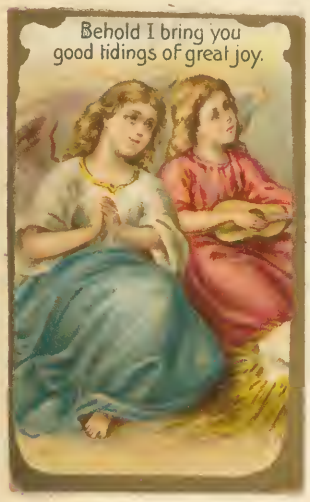
It must not be forgotten, that the distinguished Spanish Surgeon Antonio de Gimbernat bears a distinguished part in the honor of this great impulse. For while Astley Cooper was laboring for the knowledge of the Surgical Anatomy of the Inguinal Rings and the abdominal Canal, the fame of Gimbernat had spread abroad and he was rendering the same service to Operative Surgery in his accurate and beautiful delineations of the Crural Ring.

So far therefore they labored together in the great subject of the Surgical Anatomy of the Groin, and their names will be hailed in all


For unto you is born this
day in the city of David a
Saviour, which is Christ
the Lord.


The
dayspring
from on high
hath visited
us, to give
light
to them that
sit in darkness.


Glory to God in the highest
and on earth peace,
good-will toward men.


Behold I bring you
good tidings of great joy.

coming time as the greatest Benefactor to this department of Operative Medicine.

The delicate and important Operations which must ever be connected with Hernia, the sudden and imminent peril to which life is subjected on many occasions, by night and by day, will constantly urge us on, to become Masters of the subject. There is no lagging behind - no half way house - no Book nor Cadaver to consult or appeal to - the patient is before you and you must act or he will die, and if you ignorant of the parts you ought to cut, most probably you will kill him if you do cut.

Can you imagine a more awful & responsible situation for a Surgeon to be in - ignorance may kill - Knowledge may save the life of a human being.

A Husband or a Wife, a Father or a Mother may be the objects of our care, and amidst all the anxieties, questions and sympathizing solicitudes you are looked up to as their only Hope - their only comfort.

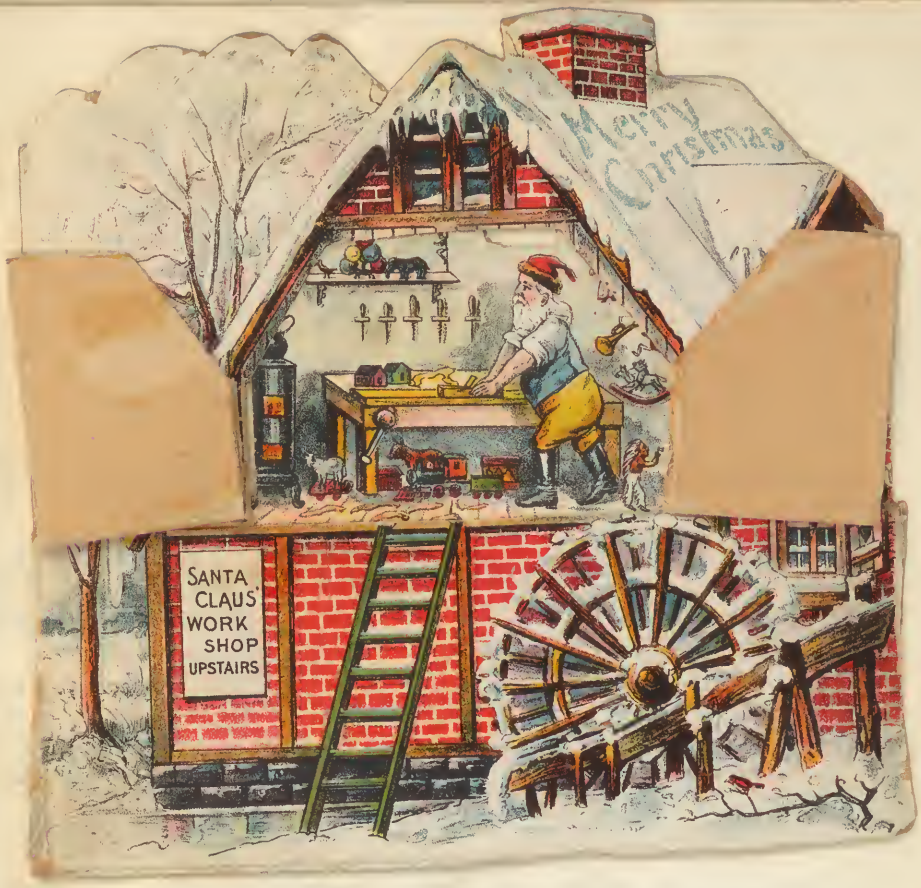
Other callings and Professions may be even so important, but they fall far short of this respon-

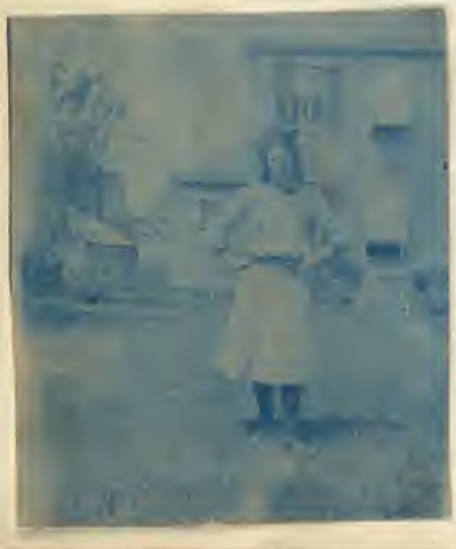
=sibilities of ones. The Lawyer and the Divine may delay an opinion, and consult their Authorities but the Surgeon must act with promptness and decision. Our knowledge must be exact and available on all occasions, it must not only be in our heads but must circulate to the ends of our fingers.

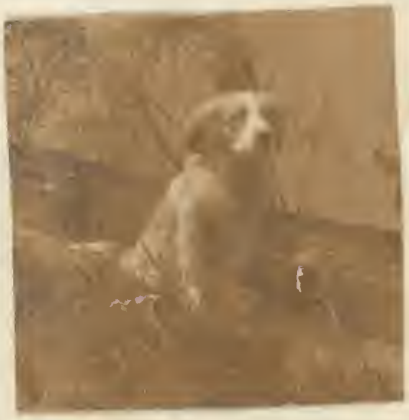
The importance of this knowledge to Surgery was soon wafted to Scotland, and awakened the attention of that excellent Anatomist, and distinguished Surgeon of Glasgow, Allan Burns. With his keen eye and Masters hand the same light was shed upon the Neck and Head, and gave birth to his invaluable work on the Surgical Anatomy of the Head and Neck.

His work is a Master-piece of study, and the application of the same principles of Relative Anatomy to the various Surgical Operations which are called for upon these important regions that Cooper and Gimbernat had so happily and successfully carried out for Inguinal and Crural Hernia.

This Volume is an enduring Monument to his fame, and ought to be studied and re-studied by every Student and Practitioner of Surgery.


Merry Christmas
SANTA CLAUS' WORK SHOP UPSTAIRS





It sheds a light and imparts a knowledge of the Surgical Relations of the one of the most impor-
=tant Regions of the body. A light that should
ever shine and illumine the path of the Operator
in every step of his knife.

But for a premature death this eminent
and excellent Anatomist and Surgeon, intended
to have extended his labours and researches,
into all the important regions of the body.
Which if accomplished in the same masterly
manner, would have been indeed a rich
Legacy to Surgery and a blessing to the hu-
=man race.

But Alas, his work was finished. His
labour was ended.

Next in the train of Benefactors to Sur-
=gery, comes Velpeau. the wonderfull Vel-
=peau. for so truly may he be styled. the Black-
=smiths Boy. Determined to study Surgery, he
travelled on foot from a remote part of France
to Paris. On his way obliged to stop and work
in a Shop to earn a few Sous, to enable him
to reach the end of his journey. There in the
midst of a mighty Capital, surrounded by a tumul-

=tuous rivalry, he studied, dispected and struggled in the greatest penury and want. But his end was accomplished, - he was studying Anatomy - he was in Paris.

The rough edge of poverty did not damnt his ambition, perseverance was his motto, and onward was his course. He encountered every obstacle, and mas=tered every difficulty.

Like his Predecessor and Cotemporary, he also struggled with poverty, Dupuytren, the Giant in Surgery, he rose by degrees to consideration, and some distinction. Such examples as Dupuy=tren and Velpeau are profitable to us all, they ought to excite our admiration and stimu=late our ambition.

Look now at the position of Velpeau. At the head of his Profession in one of the greatest Capitals of Europe. The noblest Profession that can engage the attention of Man. All by his own un=tiring efforts. What a proud triumph. What an example to imitate.

Among the various efforts of his vast in=tellect, he has given us an extensive work on

what he calls the Anatomy of Regions, in three large Volumes, called "Anatomie Chirurgicale". It embodies a vast amount of matter on this subject, and an extent of research which over-paces all the labours of his Predecessors. It is more extended and ample than can be attained by any Pupil. It must, and even will be a most valuable book of reference to the Student and Surgical Practitioner.

Its only defect is, in its extraordinary minuteness, and in the creation of too many regions, loading and embarrassing the subject too much, thereby he complicates, instead of elucidating the obscure. Therefore instead of cheering the Student it overloads and oppresses him. It is therefore more a Book for a Practitioner than a Student.

It is however a Masterly performance and ought to be in the Hands of every Student and Practitioner as a Book of constant reference.

Next Blandin appears, another Contemporary of Velpeau, in a large Volume, entitled "Anatomie Topographique". His Book displays

much less learning and labour than Velpeau, but he is thoroughly acquainted with the subject, and from the concise and luminous arrangement, will be found much more useful & practical. It is a book which you study with pleasure and infinite advantage.

The name of Blandin is familiar to all who have visited the Surgical School of Paris, and his fame alone is sufficient to stamp his Volumes with an enduring reputation.

He was the favourite Pupil of Manjebon, and the Successor by Bonedon, at an early age to the celebrated Richerand, as Professor of Surgery in the School of Medicine of Paris. This was a distinguished honor. He died at an early age.

From these General Works on Surgical Anatomy, we will for a moment turn our attention to the labours of other Men who have enriched this branch of Science by their Specialities.

In this list of worthies stands another distinguished French Surgeon, Ronsepat.

Taking a particular Region of the body, he has thrown great light on the Surgical Anatomy of the Male Urethra. Our knowledge on this subject

was poor and insufficient when he commenced his investigations, and he has not yet exhausted the subject.

To Morton and Maclise of England we are greatly indebted for a thorough investigation, and beautiful delineation of the Surgical Anatomy of the Genito-Urinary organs. Their admirable works will always be consulted with profit and advantage by the Student and Practitioner of Surgery in every Country, who takes an interest in a correct knowledge of this important subject.

Another contribution to the Science of Relative Anatomy we have in the work of Professor Harrison of Dublin on the Arteries.

Though the Experiments of Magendie may have led to a speculative Science in many respects purely so, still they have opened a new way for the advancement of useful Knowledge.

Surgeons have been led by his labours to make experiments for the benefit of sound Surgical Science, and to him we owe the investigations of Lawrence and Amussat on the Arteries - those of Travers and even those of Reybard and Lobert on Wounds of the Intestines and of Hernia, we have all felt the

value, and experienced the benefit of these enquiries and investigations, in enlarging our views of correct practice, and improving the Science of Surgical Anatomy.

Other names may yet be mentioned among the most illustrious and distinguished, who have sanctioned experiment, such as Dupetrin, Scarpa, Beclard and Sir A Coopers, all of whom have extended the boundaries of our knowledge on this subject.

Another, and the last Author on our favorite subject which we shall name is Malgaine of Paris, a distinguished Surgeon of that Capitale. He has furnished us with the best work on the Surgical Anatomy of the whole body. It is a clear and accurate exposition of every part and organ of the body, its relations & diseases. And besides the lucid style of the author, it is not so Voluminous as Velpeaus.

It is in two large Volumes, entitled "Anatomie Chirurgicale".

You see therefore, that this is a Science of yesterday, and I feel a gratification in knowing, that I lived at the Era, when the first application of this important Science of Anatomical Relations

Relation anatomy of the Integuments.

of what they are composed.

Cuticle.

Rete Mucosum

Cutis.

Demonstrate each.

Vary in different parts of the body.

Demonstrate this difference.

Scalp.

Axilla

Groin.

Hands

Feet.

a Surgeon should be aware of this difference

It influences our Operations.

The Scalp is composed of several parts.

Peculiarity of Scalp.

Composed of Scalp - so called.

Then - Adipose tissue.

Fibrinentous.

Tendinous expansion of the Occipito -

a Erysipelas we believe more frequently follows a puncture into the tissues - also a lacerated wound.

frontalis muscle -

Lastly we have the periosteum of the skull - called pericranium, - because it is the investing membrane of the cranium.

These make together the scalp -

a very compound covering -

Interesting to Surgeons -

not only as a piece of Relative Anatomy.

But to enable us to understand the injuries to which it is subject -

and to operate safely upon it -

In wounds which penetrate into the adjacent tissues, we have one set of symptoms -

In the filamentous another -

In the tendinous Aponeurosis

quite a different -

And another again when in the, bri-
-cranium -

To illustrate, or give an example -

It takes a Surgical Anatomist to explain and understand why an extravasation of blood

to form tumors must always take place in the filamentous tissue.

All the trunks of the Arteries of the Scalp are found in this tissue.

If for one moment it were to be under the Aponeurosis, it would engorge and very painful.

This is firm & inelastic.

The tumors from this circumstance would be firm and engorged.

They would be long also in forming. Now we see a slight blow, and even pulling the hair to occasion them.

They are then sudden to form, and quickly to disappear.

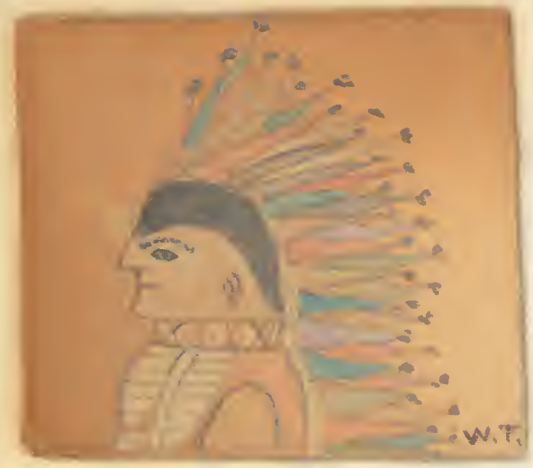
These seldom require to be punctured. Absorption is generally rapid.

Discutients may be employed.

As Lee water. Camphorated Spirits.

Muriate of Ammonia & Tinctures.

Circumstances under which they may be punctured.


W.T.

Inflamatory tumors are tender & painful.

denotes inflamation & effusion under the aponeurosis.

From the tendinous character of this structure it is unyielding & exceedingly painful.

Requires a free incision and an emollient poultice.

This soon relieves all the local and general symptoms.

It is only a knowledge of the relations Anatomy, that leads to a correct practice.

The puffy tumor of the Scalp is of quite a different character.

Denotes effusion under the pericranium, so that there is an inflamation of the Dura Mater & separation of it from the Cranium within.

If coma and Stupor attend, it justifies a free incision to the bone.

The Branches under these circumstances will be of an opaque white colour, and incased by dead.

Generally tapering in these cases is required.

Under what circumstances it may be required.

The Incisions from the removal of tumors on Bones ought to be made obliquely so as to leave the fibrinentous tissue the longest, to enable the vessels readily to be tied.

Inattention to this has occasioned serious and even fatal Hemorrhage.

Young Operators ought be aware of this as they may thereby escape danger.

Case in which the bleeding was fatal, the blood on the table.

A knowledge of the Relative Anatomy of the Branch will lead to the propriety of this kind of incision.

In the Exposition of Nævi, the importance of this kind of incision is particularly shewn.

It is an interesting fact to mention that I have never known a single instance of sloughing of the scalp, however much torn or lacerated.

Not even in Erysipelatous affections when the fibrinous tissue is destroyed and I even see the integuments sloughs.

The power of vitality must therefore be very great in the Scalp.

Its vascularity is great indeed and well known to those who have dissected a well injected scalp, or Surgeons who are in the habit of performing Operations upon it.

It possesses great powers of reproduction consequently.

This is seen not only in the adhesive process but the granulations.

I have removed a large portion of the hairy scalp in one instance for a Melanosis

and the wound granulated to Lord B. kindly to the patient recovered. See Specimen in the Museum.

No Plastic Operation from my observation is ever required upon the Scalp, not even the glissonet.

But if called for it would be I have no doubt eminently successfull.

Under all circumstances it is the Surgeons duty to save every portion of Scalp let its attachment be even so trifling.

I have been often astonished at results even under the most discouraging circumstances. Always try to save it.

Anaplasty has been practised upon every other integumental covering of the body with the exception of the palms of the hand and the soles of the feet.

As a Generic term, Anaplasty has a most extensive family of Species.

The term Anaplasty is comparatively a modern origin.

But a few years since and you will find no such word in the Books.

Soon after the introduction of this great improvement in Surgery by the immortal Sir Hunter, we soon find the term Adhesiaplasty used by Surgeons.

No Man did as much to settle the principles and establish the practice of union by the first intention, or by the adhesive process, as this eminent English Surgeon.

His work on the fundamental principles of Inflammation is original and ingenious and true. and is a lasting monument to his fame, more enduring than Marble or Brass.

It is delightful to contemplate the importance of the practice of adhesion in the walks of a Surgical Practitioner.

It commemorates the greatest Era, not only in Operative, but in Practical Surgery.

The magnificent discovery of the ligature by Ambroise Paré does not even eclipse the Hunterian era.

Hunter was an application of sound principles to the solution of a fact.

Theory and practice with him went hand and hand.

He arrived at great conclusions by the most laborious experiments.

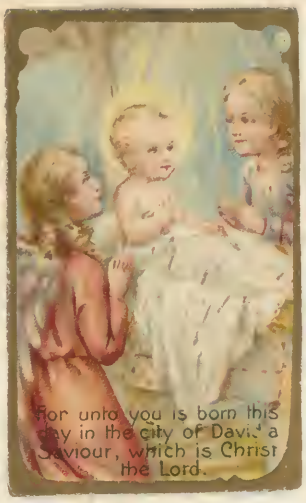
His results have benefitted all races of Men where Surgery is cultivated, and will continue to do so in all coming times.

Hunter views & opinions enable us to understand in what way a ligature obliterates an Artery.

That it is by the adhesive process, and that serous tissues or membranes, are indispensable surfaces for the plastic action.

He has taught us to know that upon

For unto you is born this day in the city of David a Saviour, which is Christ the Lord.



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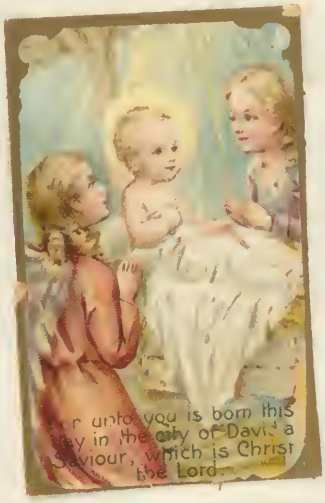

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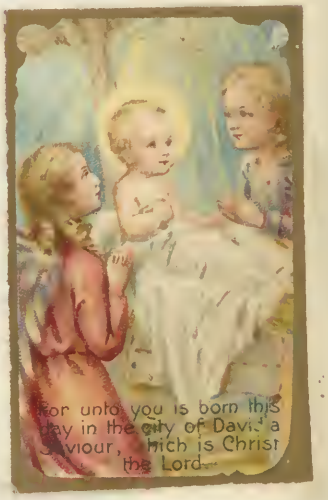


For unto you is born this day in the city of David a Saviour, which is Christ the Lord.

such tissues only are we to expect the adhesive inflammation to take place.

The Mucous Surfaces being prone to a totally different result when inflamed.

Stupid indeed must that Surgeon be who would attempt to unite by the plastic process two mucous surfaces.

Serous tissues or membranes are the parts upon which we are to look for the beautiful process of adhesive inflammation.

Upon Mucous Surfaces for the Suppurative.

Paré established the fact, that a ligature upon an Artery would arrest hemorrhage, a most important step in Operative Surgery. a monstrous improvement upon the actual Cautery of his predecessors and even his Cotemporaries.

Decidedly one of the greatest Epochs, (if not the greatest) in the whole range of the History of Surgery.

Paræus incavit
Hunterus disposuit.

As Surgeons may say this of these two great Benefactors to Surgery & as Naturalists have to the distinguished Linnæus.

Various experiments were made by Hunter to extend the adhesive process.

He tried to convert the Ileum into the Back, by accomplishing an adhesion of the Testes of the latter to the Peritoneum of the Ileum.

But in this amusing experiment he failed.

He did make the human tooth take firm hold & grow in the Comb of the Cock.

That a part of the human body, as a finger or toe, when completely detached or severed, can ever become united again to the parent stock is what I need say, but there is abundant evidence to establish the fact.

Medical Men of character have stated

What is a Gentleman?

What is a gentleman? Is it a thing
Decked with a scarf pin, a chain and a ring;
Dressed in a suit of immaculate style,
Sporting an eyeglass, a lisp and a smile,
Talking of races, of concerts, and balls,
Evening assemblies and afternoon calls,
Sunning himself at "at homes" and bazaars?
Whistling mazurkas and smoking cigars?

What is a gentleman? Say, is it one
Boasting of conquests and deeds he has done?
One who unblushingly glories to speak
Things which should call up a flush to his cheek?
One who, while railing at actions unjust,
Robs some young heart of its pureness and trust,
Scorns to steal money, or jewels, or wealth,
Thinks it no wrong to take honor by stealth?

What is a gentleman? Is it not one
Knowing instinctively what he should shun;
Speaking no word that could injure or pain;
Spreading no scandal and deepening stain?
One who knows how to put each at his ease,
Striving successfully always to please?
One who can tell by a glance at your cheek
When to be silent and when he should speak?

What is a gentleman? Is it not one
Honestly eating the bread he has won,
Walking in uprightness fearing his God,
Leaving no stain on the path he has trod?
Caring not whether his coat may be old;
Prizing sincerity far above gold,
Recking not whether his hand may be hard,
Stretching it boldly to grasp its reward?
What is a gentleman? Say, is it birth
Makes a man noble, or adds to his worth?
Is there a family tree to be had
Shady enough to conceal what is bad?
Seek out the man who has God as his guide,
Nothing to tremble at, nothing to hide,
Be he a noble or the poorest in trade,
He is the gentleman nature has made.

—*Selected.*

to use such instances, as fingers & toes; and we demand after certain cases if or like matters.

The marvellous story of Gasengat was scarcely to be believed as the noses of his patients were bitten off, & was afterwards put on & it grew fast.

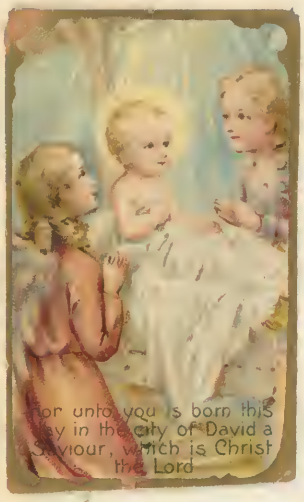
The meanest & even known any member of the body to be severed, and yet grow on was the Penis.

My Case in Blackwood's Magazine.

Entire transplantation as applied to the human body & Lance no considered in.

In all the Autoplastic Operations we have seen, performed by others and done by ourselves, the portion or patch of integuments must be left attached to the Parent stalk by an bottom, or it will have no chance of being preserved.

The most beautiful noses made by the Rhinoplastic Operation were by Baron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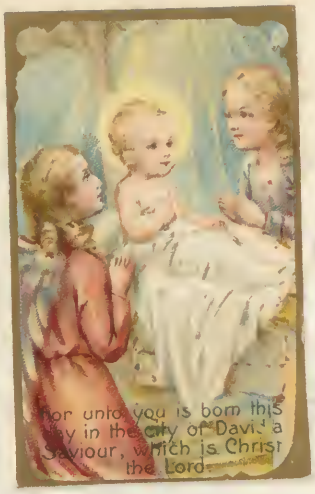
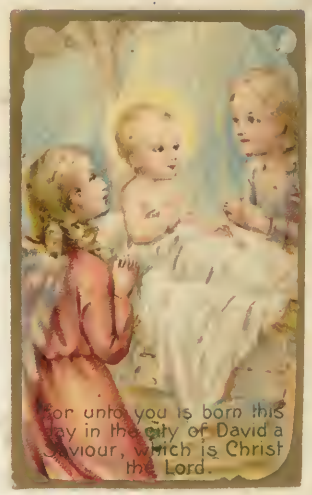
Saviour, which is Christ
the Lord


For unto you is born this
day in the city of David a
Saviour, which is Christ
the Lord.


For unto you is born this
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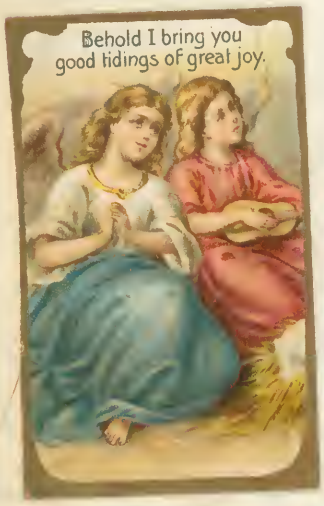
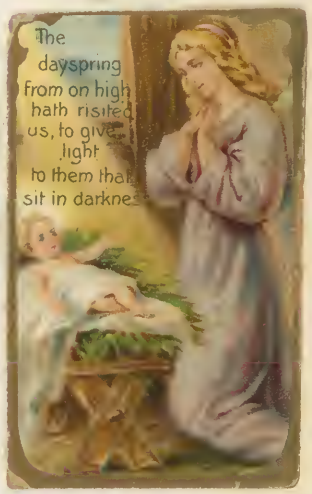

Behold I bring you
good tidings of great joy.


The
dayspring
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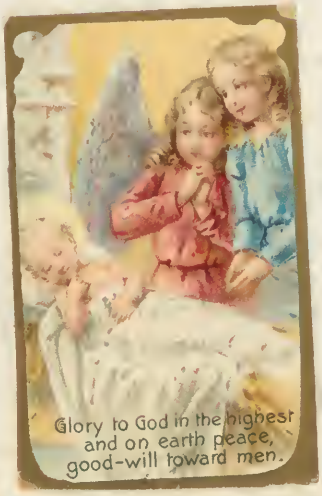
Glory to God in the highest
and on earth peace,
good-will toward men.

Graeffe and Pitt: Deiffenbach of Berlin.

The former made them from the arm and the latter from the forehead.

Those by Deiffenbach were by far the best, and he indeed may be considered to have been the Prince of Nose Makers.

The Surgeons of our Country have been very enterprizing in all these important Operations, and have equally successful with our European Brethren.

We have applied the principle of Anaplasty extensively ourselves.

To the Nose.

Eyelids.

Cheeks

Lips.

Perineum, and various other parts of the body.

From observations we have had an opportunity of making for ourselves in different countries, it is our full belief, that in no part

of Empiric is the principle of adhesion inflammation better understood and certainly more successfully practised there in our view.

We found there in Egypt that union by the first intention was truly remarkable.

Even the lateral incision for stone in the Bladder would often heal by the first intention, a result we have never met with in this Country.

In other Operations it was equally remarkable.

The simple manner of living, and the pure unvitiated constitutions of the common people of that remarkable Country and perhaps to the very dry & warm atmosphere of that region of the world, may have some agency in producing it.

The fact however is so.

Relative Anatomy of the Cranium.

As far as we may be permitted to speak of the wonderful mechanism of the Skull, it seems to be a wise provision that this bony arch is not constituted of one entire bone.

The sutures perhaps are widely provided then we may say to prevent the extension of fractures. That they have this effect I have no doubt. It is true that we often see fractures pass through the sutures & it is also true that they are often arrested by them.

The two tables also which enter into its constitution are calculated to ward off the effects of injuries. And I have no doubt also that this is a wise provision.

A solid bony arch would be much less fitted to protect the important encephalon within.

It is important that a Surgeon

should be aware of the two tables composing the greater part of the bones of the Cranium, but also that there is an intermediate cancellated structure, on account of Operations that are performed upon the bones.

Also that the two tables vary in density, & that there is very little of the cancellated structure or diploe on the outer sides of the Parietal bones, & the squamous portions of the temporal.

The greater thickness of the Cranium at one part, & they another, is important to be borne in mind by all who perform Operations, as giving confidence to the Operator, and safety to the patient.

From the great thickness of the Os occipitis, we are seldom called upon to Trephine the bone.

In two or three instances we have had occasion to Trephine the Os occipitis.

There is perhaps a general character

as to thickness of the Skulls in the White Race in the normal state, but very great variations are to be observed.

From the unusual thickness of the Crania of some individuals, and the especial thinness of others, it becomes a Surgeon to be very guarded in the use of the Trephine and Saw in every case, as he cannot know the state of the bones in this respect, unless a fracture with depression and wound exists.

I have seen in the adult where there was only a single table, & that much thinner than natural.

Dr Ballé's case at Brooklyn in which there was fracture & depression in which he trephined an adult, and the Skull was not thicker than the thumb nail.

My case (Mr Shipleaux) from whom I took a considerable portion of a parietal bone for Epilepsy, in which the bone was

not as thick as a single table, such was its straighted state. It was to all appearance perfectly natural in all other respects.

The pain of the trephine completely forced it before the saw was set.

See the specimen in my possession.

All Surgeons ought to be aware of these varieties in the thickness of the Skull.

It ought never to be taught, and much less practised, that until a change in the sound of the trephine takes place, we may go on sawing with safety.

It is well if we can to avoid the sutures in trephining as the dura Mater is more adherent about them than at other places. But we may if necessary, go on sawing more card.

Try and to avoid if possible the whole course of the sagittal suture, as beneath it is situated the longitudinal sinus.

Also about the lower and anterior

angle of the parietal bones, as at these points the trunk of the Spinous artery of the Dura Mater is to be met with.

At all these places Lawrence & Lane frequently applied the Tenaculum with perfect safety. The Spinous artery at its trunk was frequently torn through with the tenaculum. It will bleed freely, and sometimes Lawrence arrested it with a firm dossil of lint.

In two cases I met with pieces of bone driven into the longitudinal sinus which when removed has given rise to a profuse hemorrhage. There also have been readily arrested by small pledgets of lint, with the flap of scalp over it and the usual dressings.

The transverse occipital ridge may also be avoided on account of the transverse lateral sinus beneath.

Cases must seldom occur to require the Tenaculum in this situation.

I have only met with one, that required two applications of the Instrument.

During one of the perforations from the great restlessness of the patient, I injured the dura mater but no bad consequences followed.

It ought to be borne in mind by a Surgeon, that the Dura Mater is an internal periosteum of the Skull, & that from the free communication between it and the pericranium, there is a close connection between them in their diseased relations.

The situation of the Spinous Artery of the Dura Mater at the anterior and inferior angle of the parietal bone, and that it is upon the surface of this membrane, in its whole course, enables us to explain, why the largest extravasations of blood should be met with on the sides of the head. And that here was one to apply the Trephine when an area in search of blood, as a cause of compression of the brain.

It is stated by some great Practical Surgeons, that if blood or matter be deposited upon the Dura Mater, the bone without will not bleed when the pericranium is detached

from it. This I believe is an important practical lesson which I have verified in my own experience.

=

For a Simple Fracture you are not to trephine but use means to prevent Inflammation.

If symptoms of effusion come on then you must perforate the Skull.

For a Simple fracture and Depression of Bone you have the best authority for not trephining particularly if there be no symptoms of Compression.

I would be loath always trephine in Simple fracture with Depression with Symptoms of Compression.

If no symptoms of Compression exist, treat the case antiphlogistically and wait.

In Compound fracture with Depression of Bone I trephine at once, with or without symptoms of Compression.

For Pus on the Dura Mater & symptoms of compression, I trephine.

If no Matter is found on the Dura Mater we puncture it to let it out from beneath.

The same for blood. Both cases we have had recourse to select the proper place to trephine for Matter.

(a) In Compound fracture without depression you are not to trephine unless symptoms of Compression exist but treat antiphlogistically.

Appearance of the wound if there be one - colour of the Bone - tumor of the Scalp - separation of the pericranium - bone does not bleed -

Fungus Cerebri - what it is, and how to be treated -

Potassium practices less dangerous than those of small extent -

Laceration of membranes and loss of the substance of the Brain not necessarily fatal -

Less compression when the substance of the brain is discharged -

Never think a case without hope, so long as consciousness remains -

Despair the wound by after treatment -

Cranium never is reproduced -

Necessity of some connive to the opening to the Cranium - Always a soft place remains -

Relative Anatomy of the Eye.

The Eye is composed of Coats & humors. It also has muscles to move it in different directions.

The relative situations of these is necessary for the Surgeon to be acquainted with, to direct to the proper performance of the various operations which are called for at his hands.

In the Operation for Cataract he should be well acquainted with the exact position of a Cataract, that he may avoid injuring any important parts which it is associated with.

The success of this Operation frequently depends upon not injuring the Iris.

When the lens or its capsule being the seat of Cataract is so closely associated with the Iris that great care is required not to wound it.

In most cases, if it receives the least

injury, inflammation will be induced in it, and the Pupils will be either closed or be made so irregular, that vision will be more or less injured.

In the Operation by the Anterior or Posterior, great care is to be taken that the Iris is not injured by the needle.

In the anterior Operation the Pupil must always be dilated with Belladonna or Stramonium to make room to get with the needle without endangering the Iris.

Not as much care is required when the Posterior or Couching Operation is undertaken. But this seems requires care, as the needle is made to come in front of the Cataract so that it is visible in the Pupil.

The retention of these parts are ones where the necessity of great caution in the use of a needle even in the Posterior Operation.

When the needle is seen in the Pupil, the Capsule of the Lens is to be lacerated by the motion.

cment of the needle before any attempt is made to depress or dislocate it.

To for any of the various Operations for Artificial Pupils, an exact knowledge of the relations of parts is required.

The position of the Muscles should be well studied, to the point that they become attached to the Sclerotic coat, bearing well in mind.

To accomplish this, they must be studied in relation to a division of them for the distortions of the Eye called Squinting.

The modern Operations for Strabismus, calls for a division of either the Internal or External Rectus, to redress the deformity.

The Superior & Inferior Oblique muscles are more and than involved in the distortions of their regard & require to be well understood.

Indeed all parts that have a relation to Operations should be dissected, demonstrated and studied with that particular object.

For several Malignant diseases to which the Eye Ball is subject, we are obliged to Extirpate the whole organ and its attachments and relations to the surrounding parts require to be understood.

In other cases where no Malignancy exists we can Skin the Ball as it is termed, to fit it for an Artificial Eye.

The mere circumscription of the Cornea is not generally enough to accomplish the object. An incision ought to be made a little beyond the Ciliary Ligaments to be certain of accomplishing the object we wish.

A knowledge therefore of the relations of these parts is necessary.

Caruncula Lachrymalis

This little body at the inner Canthus of the Eye is believed to be glandulous.

It is subject to morbid conditions, and its relations to the Ball of the Eye ought to be understood by a Surgeon.

We are sometimes obliged to extirpate its entire, or remove tumors of it, and operate it.

$4\frac{1}{4} = \frac{6}{24}$

$6\frac{1}{3} = \frac{8}{24}$

$7\frac{1}{8} = \frac{3}{24}$

$17\frac{2}{24}$ $\quad \frac{17}{24} = 1\frac{7}{24}$

$18\frac{7}{24}$ answer

Fistula Lachrymalis.

This name conveys an improper idea of the affection intended to be described.

Most of the cases met with in practice are not fistulous.

It consists in a tumor at the canthus of the orbit, just below the inner commissure of the eyelids, from a collection of tears in the lachrymal sack, from an obstruction of the ductus ad nasum.

The distension of the lachrymal sac will plainly shew its exact situation upon the os unguis.

When pressure upon the contents of it will regurgitate through the puncta, and the sac will be emptied.

In the third stage of this affection the sack and integuments will often be ulcerated in them it is legitimately a fistula.

The sack is wholly within the tendons of orbicularis muscle, & from the bottom of it the

ductus ad nasum begins, which conveys the tears into the nose.

This duct opens into the nose below the inferior turbinated bone.

Important to be remembered, as we can frequently pass a probe up from the nose and remove the obstruction.

When the distension of the lachrymal sac exists, it is very simple and easy to open it, but in the undistended and normal state few can open it who are not acquainted with its relative situation. The bony margin of the orbit must be felt for, and if just within it we make the incision, the sac will surely be reached.

To pass a probe from the sac also requires a knowledge of relations. Many Practitioners are embarrassed to frequently fail in the attempt to find it by merely applying the probe firmly against the superciliary ridge before it is attempted to be passed into the ductus. It will readily succeed in this way, and as readily fail in the other.

In the complete state of Fistulae, or stages of ulcerations, the opening by ulceration always takes place too low down for the style to be passed through it to effect a cure. If it is placed in this direct, the motions of the molar will cause it to be forced out. A new incision must be made above in a line with the direct edge of the superciliary margin.

If the opening through the os unguis is permanently closed, as is sometimes the case, and no probe by the most skilful hand can find it, we are compelled to perforate this bone in order to establish a new opening through it, and a passage for the tears into the nose.

This can only be done by a knowledge of the relation of the os unguis to the nasal process of the superior maxillary bone.

The probe passed in a perpendicular direction, as for the natural opening will not enable us to accomplish it as it will be resisted in its passage by the nasal process of the superior maxillary bone and cannot be forced through it.

To perforate the os unguis use the point of the probe and pass it transversely from the outer canthus. When it has

pierced the bone raise it up perpendicularly and apply it to the superciliary ridge, by which the natural direction of the dent will be given to it as it passes into the nose.

Eye Lids

As these are subject to a variety of dis-
-eases and injuries, an Operation to remedy
them and repair the damage they may have
sustained, should have a constant refer-
-ence to the normal structure of these parts.

The Function in each lid must be
borne in mind as an essential element
in its formation, not to be disturbed, or
encroached upon. If from any cause, either
function is obstructed or obliterated, the
tears must flow more or less over the
under eye-lid & give the eye the appearance
of more or less weeping.

The Operations to supply defects, or
destructions of the lids from Burns, does great
honor to Modern Surgery. It is called Blepha-
-roplasty. Care, judgment and skill are
necessary to plan and execute the Opera-
-tions

Deformities of the lids from Burns and

and Cicatrices from wounds, are the most fre-
=quent causes of frightful and distressing devia-
=tions of the upper and lower lids.

To such an extent are these con-
=ditions of the lids at times, as to prevent
the Cornea from being covered even with
the greatest efforts of the patient. The sur-
=face of the Cornea becomes dry, inflamed
and thickened, and no exposure whatever
to the light can be endured.

It is an important step indeed
to adopt a plastic operation that shall
restore the use of this valuable & beautiful
organ.

We have frequently performed this
delicate and important operation and had
the most signal benefits from them.

The flap may be taken from the
Cheek or Temples. Great care must be taken
to leave the connecting isthmus of sufficient
depth and width to secure the circulation.

2 And the circulation will be more likely to preserve the vitality of the flap. Without a certain amount of circulation we cannot expect the adhesive process, and when still life the flap will perish.

The flap also should be rather redundant in size, as the tension is unfavourable to union by adhesion. I

The pressure must be carefully guarded against, as it may interrupt the circulation.

A natural anxiety to have every part united has led some non-practicals surgeons to put in too many pins or stitches. A certain number is indispensable. But if too large a number be introduced the inflammation will be augmented to such an degree, as to have the suppurative inflammation instead of the adhesive.

I have verified this important fact in a multitude of instances in my own experience and the observation I have an opportunity of making in the practice of others.

Anaplasty as applied to the Nose Lips and Cheeks.

The first step taken in these important operations was in the substitution of a new integumental nose for the original to beautify fabric of nature.

The important feature of the face is frequently cut off by swords and other warlike weapons in times of peace & war. We have known it also several times to be bitten off in brutal conflict between man & man.

In early times we read that the nose has been bitten off, and after some half an hour washed, applied, and that it has grown fast. In all the cases we have seen no restoration of the bitten off part has taken place on the contrary a permanent disfigurement has been the result.

These are the best cases for the success of anaplasty. We have adapted it very beneficially to these cases in various proportions.

destruction of the nose from Lues Venerea and Lupus, are now and then remedied by Rhinoplasty as applied to the whole member, called Rhinoplasty.

The integument originally taken by Taliacotius was from the arm or forearm in the latter times the skin or portion of integument is turned down from the forehead - these are by far the best noses that are made upon the patching plan. We believe Carpue of London introduced this improvement into Surgery, and it was extensively & successfully carried out by the celebrated Liston.

We remember to have seen two noses made by the celebrated Baron Graeffe when in Berlin, from the arm. They were much symmetrical and beautiful than several we have seen made by Dieffenbach from the forehead.

We also saw Prof. Dabowitsch of St Petersburgh, make one from the forehead which looked to succeed very well.

Q. See several drawings in my Port-folio.

Sloughing of the Cheek from Scarlatina, Typhus - the violent actions of Mercury on the Gums, and Cancerous affections of the Under Lip spreading from thence to the Cheeks and invading the corner of the mouth and upper lip are the cases in which we have repeatedly applied Anaplasty in various proportions, with the greatest benefit - &c.

These forms of Anaplasty are denominated by modern authors, when applied to the Cheeks.
to the Lips.

We have seen and greatly remedied shocking deformities of all these parts, but sometimes the destruction of the side of the face is so considerable that it does not admit of any separation from the surrounding parts. Then our only resource is in a silver plate fashioned like the sound side of the face, painted skin colour and worn over the defect.

We are free to say, that if we were

Noseless ourselves, we would not permit the best Nose-Makers in Europe or America, to practise upon us but would infinitely prefer the Papier Maché imitations.—

We have an opportunity sometimes in these Operations about the lips, cheeks and Eyes, of availing ourselves very advantageously of sliding portions of integument (glissement) by merely detaching them from the bone or parts underneath.

In one instance in the person of Rudges from Dispowis we removed an extensive Cancer which had destroyed the entire under lip & spread into each angle of the mouth. The incision extended beyond the angles of the mouth into the cheeks and swept around near the margin of the chin, to exclude all the diseased parts. By detaching the balance of integument from the very margin of the chin, and extending the separation of in-

ligament to the thyroid cartilage. I was readily able to slide the whole up the length of the chin, so as very satisfactorily to repair the damages. It succeeded admirably.

17
2
34

Relations of the Duct of the Parotid Gland.

Whoever operates upon the cheeks should be fully aware of the course of the Parotid duct and the Masseter muscles to the points of its termination through the Buccinator muscles & membranes of the mouth.

A line drawn from the lower part of the lobe of the Ear, to the lower margin of an Alar of the nose, will describe very accurately the course of this duct.

Another perpendicular line from the external Canthus of the orbit, will accurately indicate the inner margin of the Masseter, & opening of the duct into the mouth.

All operations performed in this region ought always to have reference to the course and terminations of this duct. Otherwise from wounds of it troublesome & perhaps incurable salivary fistulas may be the results.

The situation of the Per Anseccinus, and course of the principal branches of the Portio dura, or Facial Respiratory Nerve, and a

Nerves of the Face.
their
Surgical Relations.

=

Few nerves in the Body are more interesting to the Pathologist or Surgeon than the Sensitive branches of the 5th pair.

The Cruel and agonizing diseases of one or more branches of them, denominated Tic Douloureux or Neuralgia, make them important objects of study.

Not only to find out the changes which are produced in them by this curious disease, but to know their relations with other parts, that we may direct a Surgical Operation if necessary, for its relief or cure.

The trunk of the Ophthalmic branch of Willis, after passing through the foramen lacerum and entering the orbit, close to the roof of the orbit, and passes through the supraorbital foramen, the notch of the, or over the ridge itself. It is distributed to the integuments mostly

of the forehead.

The division of this nerve is easily accomplished either just within the bony margin, first feeling for the notch as a direction for entering the pointed bistoury. By sweeping the end of the knife closely along the roof of the orbit, previously pressing down the ball of the eye, the trunk of the nerve will easily be caught by it and divided.

It may also be cut just above the ridge, by the same knife, and to young Surgeons, this will be the preferable place as it is entirely out of any danger.

In both places the numbness upon the forehead in the track of the nerve will infallibly denote that it has been cut.

The second branch of the 5th pair or infra orbitals comes out upon the face by the infra orbital foramen.

The exact situation of this in relation to the bony margin of the superior maxillary bone must be carefully learned. The depression can generally be felt through the soft

parts from without to convey a correct idea of the exact situation of the foramen.

As this nerve instantly divides into a number of branches the instant it emerges from the foramen, it is important to divide it at its exit, to secure the full benefit of the operation.

The same sensations of numbness will follow upon the cheek, upper lip and side of the nose, if the trunk is cut, that was experienced on the forehead.

The third branch of the 5th pair or inferior Maxillary makes its exit from the foramen mentale. This foramen is situated about the root of the first bicuspis tooth nearly half way on the body of the bone. If a perpendicular line be drawn from the supra orbitar foramen to the base of the lower jaw it will very accurately point out the situation of the mentale hole.

This we have often examined and never found it to fail. When all the teeth are gone this is an excellent guide.

To avoid this nerve the bistoury is passed within the mouth. The lip being turned down the cheek is divided to the extent of half an inch opposite the root of the first bicuspid tooth. The knife is then passed flatwise close to the bone & the cut made from behind forward.

In this way we have been enabled to readily divide the nerve as it comes out of the foramen. If it divides a sensation of numbness will be felt to some distance about the cheek, chin & lower lip.

To secure the full division of these nerves I am in the habit of making several sections through the same external incision. The trunk of the nerve is thereby several times divided, and perhaps the union of it also may be somewhat retarded.

These nerves generally unite in from three to four months, and the disease returns again with all its former force. In a few cases I have known the operation effect an entire cure. It always cures until the function of sensation returns, then reappears the enemy.

In Neuralgia of many parts of the body we can excise a portion of the trunk of a nerve and thereby prolong the cure but in the nerves of the face we cannot attempt this without in the first place considerably disfiguring the face, and secondly the shortness of the trunks forbids it.

Portio dura or Facial Respiratory.

The situation of this nerve as it comes out at the foramen stylo mastoideum is interesting to us as Surgeons. The trunk here is of some length before it enters the Parotid Gland. This is important to be recollected, as it is at this point that it has been advised to divide it in cases of obstinate neuralgic affections of the side of the face which follow the branches which go off in front of the Parotid.

As this nerve emerges from the Parotid, there is a peculiar conformation of it which is called the Pes Anserinus, situated close to the Parotid duct. Several branches go off from this and to the face in different directions.

Since Sir Charles Bells views were made public, ascribing to this nerve only the function of motion, very little attention has been given to it as an object of surgical interest. That it is more a nerve of motion than sensation

a You have but to dissect the nerves of the entire side of the face to be convinced of the intimate and wonderful connections (anastomosis) of the branches of the portio dura and the second branch of the fifth pair. To look at this dried specimen of a masterly dissection you must inevitably come to the same conclusions.

It is more than I can comprehend that this wonderful anastomosis of these two nerves, should not make them have a community of functions, as they intend by such an intimacy in organization.

One thing is very certain, that anastomosis in the nervous system does not serve the same purposes, that the inosculation of arteries does to the vascular system.

In severe cases of neuralgia of the trifacial nerves, the branches of the portio dura and even the trunk itself is involved in the disease. Of this there cannot be a question. I have seen it repeatedly.

I fully believe, but that it has also more or less of the functions of sensation, I also am well satisfied of. The observations I have made from divisions of it which Mr Lane ~~[illegible]~~ taken place in Extirpating the Parotid Gland, and other tumors in the vicinity, convinces me of this fact.

Every Practitioner of experience must have observed in severe cases of Neuralgia of the tri-facial nerves, that all the branches of the Portio dura, even to the trunk, are involved in this agonizing disease. I am quite sure of this myself.[a]

The close proximity of the branches of this nerves to the Parotid Duct in front of the Masseter and across it makes the division of these branches objectionable, on account of the formation of a Salivary fistula. They have however been cut by Surgeons before the views of Sir Charles were made public.

You would always prefer in these cases to search for the trunk as the most effectual Operations. In all cases trunks are preferable

to branches, and the excision of a portion of the nerve - at least half an inch of the nerve in this situation was taken removed -

If the relation of this nerve is understood there is no danger in the operation, but there is difficulty -

An incision about two inches long in front of the mastoid process & close to it, will expose the inner edge of the Sterno mastoid muscle - Then the origin of the Digastric muscle will be seen - By continuing the dissection in front of this, we arrive at the root of this process by seperating the cellular substance with the handle of the knife & forceps, and just in advance a little, the nerve will be found - The styloid process & the root of the mastoid, cannot fail to direct us to the exit of the nerve - After the Digastric is exposed very little wrong ought to be made of a cutting instrument -

Parotid Gland.

The situation and relations of this Gland are very important to the Surgeon.

It is not enough to know that it is the largest of the salivary glands and is situated in front of the Ear, and that it is an aggregation of small glands which ultimately terminate in one general excretory duct.

This is all very well for an Anatomist but a Surgeon requires more to warrant him in encountering an Operation upon this important and dangerous region. He must know the parts it is related with to enable him to proceed with satisfaction to himself and safety to his patient.

Above it is connected simply with the zygoma temporale – in front it lays a little over the Masseter muscle – behind it below it lays over the base of the jaw, and in front it comes forward to the stylo maxillary ligament, which alone sep-

-ciates it from the Submaxillary gland - below and in front it lays upon the digastric muscle and pharynx & external Carotid artery - upon the deep jugular and Internal Carotid artery - posteriorly it lays over the mastoid process and the sterno mastoid muscle, and deepen upon the posterior digastric & styloid process -

From these various connections the Gland has to be seperated when it is removed in a Surgical Operation -

That it can be removed is now a settled question in Surgery - at all times it is difficult and dangerous -

It is always best to tie the External or Common Carotid before attempting its removal - It can be done alone must admit, but safety to the patient and comfort to the Operator ought to induce every one to do it -

There are several diseases of it which require the whole Gland to be removed -

Tumors over and upon this Gland have beyond all doubt been removed for the Carotid

itself - And even encysted tumors in the body of the gland have presented a remarkable resemblance to it, so from prepared the gland has been almost entirely absorbed -

Enlargements of the Socii Parotidis, have been mistaken for the Gland itself - These bodies are in front of the body of the Parotid in the course of the Parotid duct - they resemble in structure and appearance the body of the Gland but are isolated and are without any excretory duct -

Since the time of Beclard in 1811 who was the first among the French to remove by an Operation this Gland, American Surgeons have done a large share in establishing the propriety and safety of this Operation -

Sub Maxillary Gland.

This the second in size of the Salivary Glands is situated below the base of the lower jaw and in front of the Parotid - from which it only is separated by the stylo-maxillary ligament. It is covered by the platisma myoides and superficial cervical fascia, and a lamina from the deep cervical closely invests it.

This Gland lies upon the mylo-hyoideus muscle. Its excretory duct passes upward & forward and opens into the mouth by the side of the frenum of the tongue.

It is sometimes affected by Scirrhus hardness which degenerates into Carcinomatous ulceration.

We have removed it in the latter state when nearly the size of the fist.

The facial vein & artery run over the base of the Gland about the point where the gland comes in contact with the Parotid.

Lower Jaw

This in the adult is composed of one bone, but in the Infant it is made up of two portions united at the Chin.

As a whole it is very important to a Surgeon, from its relations, and the accidents and diseases to which it is subjects.

It has several muscles which belong to it and influence its movements.

The Genio Hyoideus
Digastricus.
Masseter.
Temporalis
Pterygoidei { External.
Internal.

Other muscles are attached to this bone, but are not its moving powers.

Every part of this bone is concerned in some operation or injury, and ought to be minutely understood by every Surgeon.

The Chin or anterior angle
Base.
Posterior angle

Coronoid process.

Condyloid process.

The peculiarity of the temporo-maxillary articulation.

Interarticular Cartilage.

It is necessary to understand this articulation with the temporal bone, to enable us to cut advantageously and safely into the joints when we wish to disarticulate the bone when disease requires it removal.

After separating the temporal muscle from the Coronoid process we cut into the joint in front, and by keeping closer to the condyloid process we open into the joint and thereby avoid wounding the internal maxillary artery, the free hemorrhage from which would complicate the operation.

This bone in part, and the whole may be removed successfully for Osteo-Sarcoma, and other diseases, and at both articulations it has been taken away for Necrosis.

The bone in many instances removed

large portions of it for Osteo-Sarcoma. In one very formidable case there forth of the tumor being nearly the size of the patients head. See Prince's Case, and Specimen in the Museum. See also a series of other specimens in my Collection of Morbid Surgical Pathology.

Dr Carnochan has in the same Operation for Necrosis of the entire bone taken it away at both temporo-maxillary articulations. The articulating surface on both condyloid processes were entirely sound. I saw the patient when well. There was very little deformity.

This is the first instance on record of the entire removal of the lower jaw. It will be questioned by many Surgeons, whether there was a necessity for this procedure, it being only a case of Necrosis.

The bone on each side was sound a little above the posterior angles, and some no doubt will say it would have been better Surgery to have left these sound portions as new starting points for the reproduction of a new Jaw.